What is Claimed is:

1. A semiconductor device having an isolation region, wherein the semiconductor device is formed by a process comprising the steps of:

(a) successively depositing a pad oxide film, and a pad nitride film over a substrate;

(b) selectively removing the pad oxide film, the pad nitride film, and the substrate, to form a trench, and filling the trench with an isolation oxide film;

(c) injecting nitrogen ions into an entire surface of the pad nitride film, inclusive of the isolation oxide film, to form an oxynitride film in a region of the isolation oxide film;

(d) removing the pad nitride film and the pad oxide film; and

(e) successively depositing a gate oxide film and a polysilicon layer on the substrate.

2. The semiconductor device as claimed in claim 1, wherein the step of filling the trench with an isolation oxide film in the step (b) includes:

depositing the isolation oxide film sufficient to fully fill the trench; and

planarizing the isolation oxide film to a height of a surface of the pad nitride film.

3. The semiconductor device as claimed in claim 1, wherein the step (c) includes injecting the nitrogen ions to concentrate at a depth from a surface of the isolation oxide film in a range of about 300 Å to 500 Å during the formation of the oxynitride film.

4. The semiconductor device as claimed in claim 3, wherein the step (c) includes making a tilted injection.

5. The semiconductor device as claimed in claim 4, wherein the tilted injection is performed at an angle in a range of about 0°-45°.